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**IS : 545 - 1984**  
(Reaffirmed 2009)

*Indian Standard*

**SPECIFICATION FOR  
MAHUA OIL**

*( Third Revision )*

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

**Gr 2**

*October 1984*

*Indian Standard*  
**SPECIFICATION FOR**  
**MAHUA OIL**  
*( Third Revision )*

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**AMENDMENT NO. 1 JANUARY 1990**  
**TO**  
**IS : 545 - 1984 SPECIFICATION FOR MAHUA OIL**  
*( Third Revision )*

( *Page 4, clause 4.3* ) — Substitute the following for the existing clause:

**'4.3 Admixture with Other Oils** — The material shall be free from admixture of other oils.

**4.3.1** The material shall be free from non-edible oils, when tested in accordance with 9, 10, 11, 12, 14, 15 and 16 of IS : 548 ( Part 2 )-1976\*.

( *Page 6, clause 5.2.1* ) — Add the following new clause after 5.2.1:

**5.2.2** The containers may also be marked with the Standard Mark.

**Notes** — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer, BIS marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers, or producers may be obtained from the Bureau of Indian Standards.

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\*Methods of sampling and test for oils and fats : Part 2 Purity test.

**AMENDMENT NO. 2 SEPTEMBER 1995**  
**TO**  
**IS 545 : 1984 SPECIFICATION FOR MAHUA OIL**  
**( Third Revision )**

( *Page 3, Foreword, clause 0.3* ) — Add the following clause 0.4 after clause 0.3 and renumber the subsequent clause:

‘0.4 A scheme for labelling environment friendly products to be known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests ( MEF ). The ECO Mark shall be administered by the Bureau of Indian Standards ( BIS ) under the BIS Act, 1986 as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR 85(E) dated 21 February 1991. For a product to be eligible for marking with the ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environment friendly ( EF ) requirements. The EF requirements for *Mahua* oil are therefore being included through an amendment.

This amendment is based on the Gazette Notification No. 678 dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.’

( *Page 5, Table 1* ) — Add the following clauses after Table 1:

**‘4.5 Optional Requirements for ECO Mark**

**4.5.1 General Requirements**

**4.5.1.1** The product shall conform to the requirements of quality prescribed under clauses 4.1 to 4.4.

**4.5.1.2** The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the *Water ( Prevention and Control of Pollution ) Act, 1974*; *Air ( Prevention and Control of Pollution ) Act, 1981*; *Water ( Prevention and Control of Pollution ) Cess Act, 1977* respectively, along with the authorization, if required under the *Environment ( Protection ) Act, 1986*, while applying for ECO Mark.

**4.5.2 Specific Requirements**

**Amend No. 2 to IS 545 : 1984**

**4.5.2.1** The product shall not contain aflatoxin, more than 5 mg/kg, when tested by the method prescribed in Appendix A.

**4.5.2.2** The pesticide residues, if any, shall not exceed the tolerance limits as prescribed in the *Prevention of Food Adulteration Act, 1954* and *Rules* made thereunder.

**4.5.2.3** Only permitted antioxidants not exceeding the quantities specified against each as prescribed under the *Prevention of Food Adulteration Act, 1954* and *Rules* made thereunder, shall be used, if required.

**4.5.2.4** The product shall not contain any of the toxic metals in excess of the quantities prescribed in Table 2.

**TABLE 2 LIMITS FOR TOXIC METALS**

SL NO.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
i)	Lead, mg/kg, Max	5.0	15 of IS 1699 : 1995*
ii)	Arsenic, mg/kg, Max	0.5	do
iii)	Cadmium, mg/kg, Max	1.0	do
iv)	Mercury (total) mg/kg, Max	0.25	do

\*Methods of sampling and test for food colours ( second revision ).

( *Page 5, clause 5.1* ) — Add the following clause 5.1.1 after clause 5.1:

**‘5.1.1 For ECO Mark the product shall be packed in such packages which are made from recyclable ( that is which can be re-processed to manufacture any useful product ) or biodegradable materials.’**

( *Page 6, clause 6.1* ) — Add the following clause 6.1.1 after clause 6.1:

**“6.1.1 For ECO Mark the containers shall be marked with the following information:**

- a) List of identified critical ingredients in descending order of quantity, percent by mass, which shall include ‘made from *Mahua* oil’;**
- b) The brief criteria for which the product has been labelled for ECO Mark; and**
- c) Shelf life of the product.”**

(Page 6, clause 7.2) — Add the following Appendix after clause 7.2:

**'APPENDIX A**  
(Clause 4.5.2.1)

**DETERMINATION OF AFLATOXIN**

**A-1 REAGENTS**

**A-1.1 Acetone, 70 Percent** — 700 ml acetone in 300 ml distilled water.

**A-1.2 Acetone, 20 Percent** — 200 ml acetone in 800 ml distilled water.

**A-1.3 Lead Acetate, 20 Percent** — 200 g neutral acetate in distilled water and 3 ml glacial acetic acid, diluted to one litre.

**A-2 PROCEDURE**

**A-2.1** Dissolve 30 g sample in 100 ml hexane.

**A-2.2** Extract with 3 × 50 ml 70 percent acetone.

**A-2.3** To the extract add 60 ml distilled water and 20 ml lead acetate.

**A-2.4** Boil to reduce volume to 150 ml. Cool to about 20°C.

**A-2.5** Filter and wash with 20 percent acetone.

**A-2.6** Extract filtrate and washings with 3 × 50 ml chloroform.

**A-2.7** Pass chloroform layer through anhydrous sodium sulphate.

**A-2.8** Concentrate to 50 ml and spot on TLC plate.

**A-3 CALCULATION**

$$\text{Aflatoxin, mg/kg} = \frac{V \times s \times 1000}{v \times m}$$

where

*V* = volume of extract in ml,

*v* = volume of extract giving minimum observable fluorescence in  $\mu$ l,

*m* = mass of sample in g, and

*s* = standard toxin giving minimum observable fluorescence in  $\mu$ g.'

(FAD 44)

**AMENDMENT NO. 3 MARCH 2002  
TO  
IS 545 : 1984 SPECIFICATION FOR MAHUA OIL  
( *Third Revision* )**

( *Amendment No. 2, page 2, clause 4.5.2.1* ) — Substitute '5  $\mu\text{g}/\text{kg}$ ' for 'mg/kg'.

, FAD 44 )

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Reprography Unit, BIS, New Delhi, India

*Indian Standard*  
SPECIFICATION FOR  
*MAHUA OIL*  
( *Third Revision* )

**O. FOREWORD**

**0.1** This Indian Standard ( Third Revision ) was adopted by the Indian Standards Institution on 13 August 1984, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard was first published in 1954. The first revision was issued in 1963 in which the limit for titre was amended and the limit for moisture was prescribed so as to include both the moisture and the insoluble impurities. The second revision in 1968 amalgamated IS : 545-1954\* with IS : 3475-1966†, which was subsequently withdrawn.

**0.2.1** In this revision, another grade of *MAHUA* oil, namely, edible grade, has been incorporated and the assistance for this has been drawn from PFA rules.

**0.3** *MAHUA* oil, also known as *MOWRAH* oil, is obtained from the seeds of two trees: *Madhuca indica* J.F. Gmelin, syn. *Madhuca latifolia* ( Roxb. ) Macbride and *Madhuca longifolia* ( Koenig ) Macbride; both belonging to the family Sapotaceae. *Madhuca indica* grows chiefly in Madhya Pradesh, Uttar Pradesh, Bihar, Gujarat and in parts of West Bengal, Maharashtra, Andhra Pradesh and South India; while *Madhuca longifolia* grows only in South India. The oil is extensively used in the manufacture of soaps and lubricating greases and for edible purposes.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Specification for *MAHUA* oil ( *second revision* ).

†Specification for solvent-extracted *MAHUA* ( *MOWRAH* ) oil.

‡Rules for rounding off numerical values ( *revised* ).

## 1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for *MAHUA* oil intended for both edible and non-edible industrial purposes.

## 2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given under 2 of IS : 548 ( Part 1 )-1964\* shall apply.

## 3. GRADES

3.1 The material shall be of the following three grades:

- a) *Refined Grade* — Suitable for edible purposes.
- b) *Raw Grade 1* — Suitable for making *vanaspati* and refined oil and not for direct human consumption.
- c) *Raw Grade 2* — Suitable for industrial purposes.

## 4. REQUIREMENTS

### 4.1 Description

4.1.1 *For Refined Grade* — The material shall be expressed from clean and sound kernels of either *Madhuca indica* J.F. Gmelin, syn. *Madhuca latifolia* ( Roxb. ) Macbride or *Madhuca longifolia* ( Koenig ) Macbride, or a mixture of both. It shall be clear and shall be free from rancidity, suspended or other foreign matter, separated water, added colouring or flavouring substances or mineral oil.

4.1.2 *For Raw Grade 1 and Raw Grade 2* — The material shall be obtained from good quality *MAHUA* cake or from the clean and sound kernels of either *Madhuca indica* J.F. Gmelin, syn. *Madhuca latifolia* ( Roxb. ) Macbride *Madhuca longifolia* ( Koenig ) Macbride, or a mixture of both, by a process of solvent-extraction or from *MAHUA* kernels by a process of expression. The material shall be clear and free from rancidity, adulterants, sediment, suspended and other foreign matter, separated water and added colouring and flavouring substances.

4.2 The clarity of the material shall be judged by the absence of turbidity after keeping the filtered sample at 50°C for 24 hours.

4.3 **Admixture with Other Oils** — The material shall be free from admixture with other oils, when tested according to the methods prescribed under 20 of IS : 548 ( Part 1 )-1964\*.

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\*Methods of sampling and test for oils and fats: Part 1 Sampling, physical and chemical tests ( revised ).

**4.4** The material shall comply with the requirements given in Table 1.

**TABLE 1 REQUIREMENTS FOR MAHUA OIL**  
(*Clauses 4.4 and 7.1*)

SL No.	CHARACTERISTIC	REQUIREMENT FOR			METHOD OF TEST, REF TO CL NO.
		Refined Grade	Raw Grade 1	Raw Grade 2	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Moisture and insoluble impurities, percent by mass, <i>Max</i>	0.10	0.25	0.5	5 & 6
ii)	Colour in a $\frac{1}{4}$ -in cell on the Lovibond scale, expressed as $T + 5R$ , not deeper than	10	30	50	13
iii)	Refractive index at 40°C	1.459 0	—	1.461 0	10
iv)	Specific gravity at 90/30°C	0.862	—	0.875	11
v)	Saponification value	187-196	187-196	187-196	15
vi)	Iodine value	58-70	58-70	58-70	14
vii)	Unsaponifiable matter, percent by mass, <i>Max</i>	2.0	3.0	3.0	8
viii)	Acid value, <i>Max</i>	0.5	20.0	Above 20	7
ix)	Titre (°C), <i>Min</i>	40	40	40	12
x)	Flash point Pensky-Martens (closed) °C, <i>Min</i>	250	100	100	P : 21 of IS : 1448†

\*Methods of sampling and test for oils and fats: Part 1 Sampling, physical and chemical tests (*revised*).

†Methods of test for petroleum and its products: P: 21 Flash point (closed) by Pensky-Martens apparatus (*first revision*).

## 5. PACKING AND MARKING

**5.1** **Packing** — The material shall be supplied in suitable well-closed containers, as agreed to between the purchaser and the supplier.

**5.2** **Marking** — Each container shall be marked with the following:

- Manufacturer's name and his recognized trade-mark, if any;
- Name and grade of the material;
- Mass of the material in the container;
- Batch No. or lot No. in code or otherwise; and
- Month and year of manufacture.

**5.2.1** In case of Raw Grade 2, the containers shall also be suitably marked 'FOR INDUSTRIAL USES'.

## 6. SAMPLING

**6.1** Representative samples of the material shall be drawn as prescribed under 3 of IS : 548 ( Part 1 )-1964\*.

## 7. TESTS

**7.1** Tests shall be carried out as prescribed in IS : 548 ( Part 1 )-1964\* and IS : 1448†. References to the relevant clauses of these standards are given in col 6 of Table 1.

**7.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( see IS : 1070-1977‡ ) shall be used in tests.

**NOTE** — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

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\*Methods of sampling and test for oils and fats: Part 1 Sampling, physical and chemical tests ( *revised* ).

†Methods of test for petroleum and its products.

‡Specification for water for general laboratory use ( *second revision* ).

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